Ontario

ATF ALTERNATIVE TRANSPORTATION FUELS in Ontario

SOURCEBOOK SOURCEBOOK SOURCEBOOK

Ministry of Environment and Energy

ALTERNATIVE TRANSPORTATION FUELS in Ontario

Ontario

Ministry of Environment and Energy

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Contents

The first section of this publication is an **investment guide** that provides information on the size and expected growth rate of the North American Alternative Transportation Fuels (ATF) market; Ontario's proximity and access to major markets; and, a number of factors that make Ontario an attractive place to operate an ATF business.

The second section is a **business directory** which contains information on the capabilities and the products and services offered by all of the major players in Ontario's ATF industry.

Interested parties are encouraged to contact the establishments directly for any further information.

Investment Guide

Business Directory

Introduction to Ontario's Industry

Ontario provided an early and enthusiastic focus for the establishment of the Alternative Transportation Fuels (ATFs) market. Since the start of the 1980s, Ontario has made available financial incentives to convert vehicles to ATFs; maintained taxes at lower levels on ATFs than on conventional fuels; and, directly funded ATF research and development.

Supporting Ontario's actions, the federal government and suppliers of ATFs have also stimulated growth of the industry with financial and other incentives for vehicles and the refuelling infrastructure, as well as directly funding ATF research and development.

Government and private sector support has nurtured a number of entrepreneurial companies that have become leaders in ATF technology and expertise. This early involvement and accumulated experience has meant that products and services supplied by Ontario companies have been well received in both domestic and export markets.

Ontario's ATF industry is advantageously positioned to contribute to the rapid growth of the market for alternative fuel vehicles that is expected, starting in the mid-1990s. Whether the need is for vehicle fuel systems; factory-optimized vehicles; research, development and testing services; refuelling stations and components; or supply of fuel, Ontario companies meet the most demanding customer requirements.

Ontario's ATF industry consists of some 40 establishments that manufacture and distribute ATF products and/or carry out research, development and testing. About 720 people are directly employed in the industry. Total sales were approximately $130 million in 1993. Eighty percent of the value of the industry's output of tradeable goods and services is exported, mainly to the United States. The manufacturing sector of Ontario's ATF industry invests heavily in research and development -- the equivalent of 12 percent of sales.

Market Opportunities

Rapid growth is expected in demand for Alternative Fuel Vehicles in North America.

Alternative Transportation Fuels offer the potential to reduce air pollution, make a contribution to energy self-sufficiency by lessening North America's dependence on imported crude oil, and lower motor vehicle operating costs.

In order to take advantage of the potential benefits of ATFs, governments in Canada, the United States and Mexico all provide inducements to increase the size of the alternative fuel vehicle fleet.

These factors are expected to create significant demand for alternative fuel vehicles over the next 20 to 30 years.

The growth rate in alternative fuel vehicles is expected to be highest in the United States where federal, state and local laws, that specify the minimum number of alternative fuel vehicles to be acquired by government and private fleets, have been enacted.

Some recent Canadian and US forecasts project strong ATF growth:

Natural Resources Canada:

Alternative transportation fuel demand is expected to increase from 1.95 percent of road transport demand in 1991 to 6.28 percent in 2020.

California Energy Commission:

By 2010, one-third of all vehicles sold in California are expected to be alternative fuel vehicles.

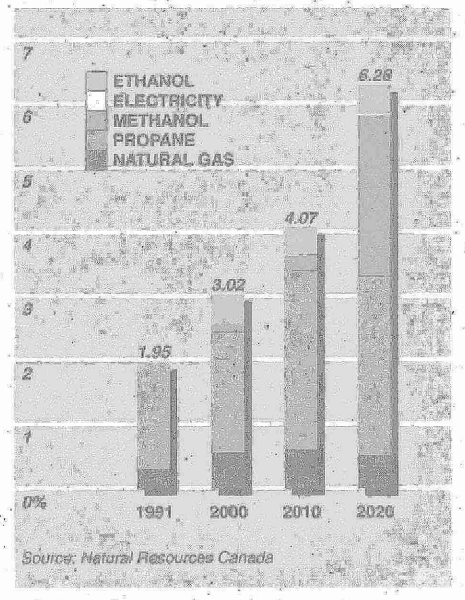
New York State Energy Planning Board:

The number of alternative fuel vehicles registered in New York is expected to increase from 3,000 in 1993 to 1.1 million in 2010.

University of Pennsylvania:

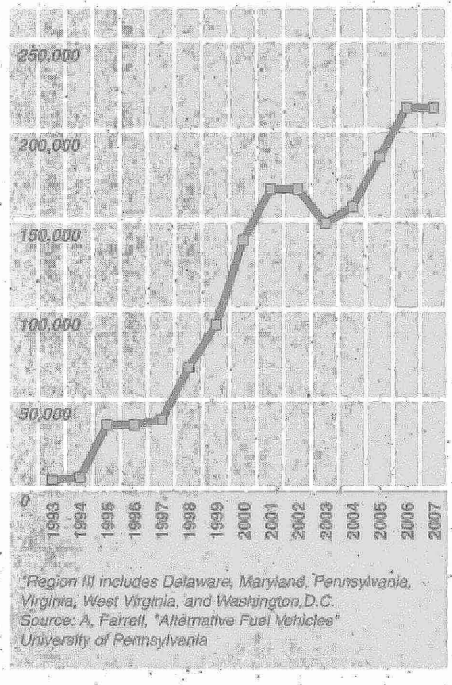
The number of alternative fuel vehicles sold in Region III (Delaware, Maryland, Pennsylvania, Virginia, West Virginia and Washington, D.C.) is expected to increase from 5,000 in 1993 to more than 200,000 in 2006.

Alternative Transportation Fuels
(Percent of road transport demand)



Source: Natural Resources Canada

Alternative Fuel Vehicle Use in Region III
(EPACT, CAAA, State/Local Laws, and Current Trends)



Region III includes Delaware, Maryland, Pennsylvania, Virginia, West Virginia, and Washington,D.C.
Source: A. Farrell, "Alternative Fuel Vehicles" University of Pennsylvania

Access to Key Markets

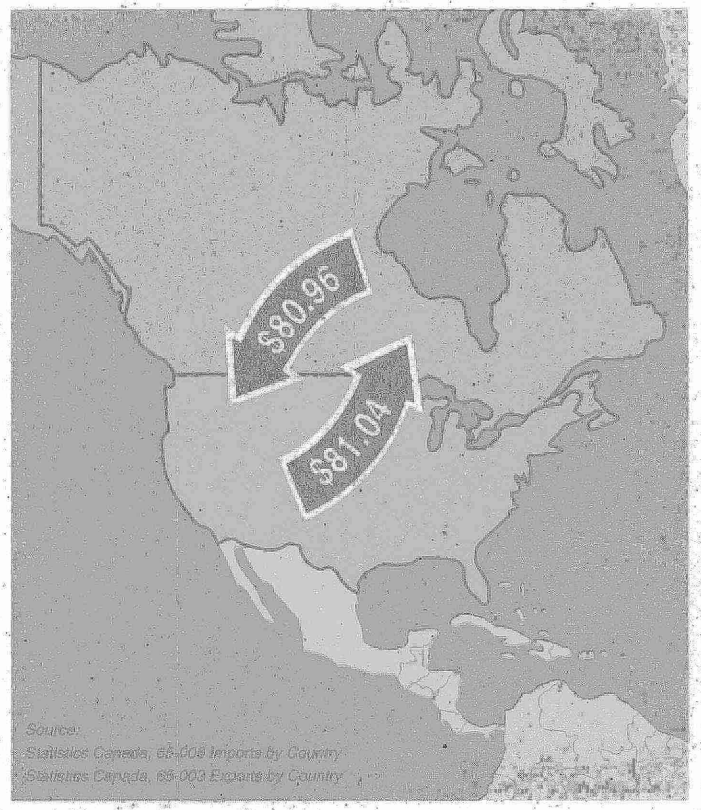
The North American market is integrated.

The Canadian and United States automotive markets have been integrated under the Automotive Products Trade Agreement (Auto Pact) since 1965.

The North American Free Trade Agreement, which came into effect on January 1, 1994 extends preferential access for Canadian suppliers to the Mexican market.

More than 85 percent of the value of motor vehicles and parts produced in Canada is exported to the United States; and, 75 percent of the value of output of the manufacturing sector of Ontario's ATF industry is exported to the United States.

Value of Merchandise Trade Between Canada and the United States, 1993 (Billions of Dollars)



Source:
Statistics Canada, 65-003 Imports by Country
Statistics Canada, 65-003 Exports by Country

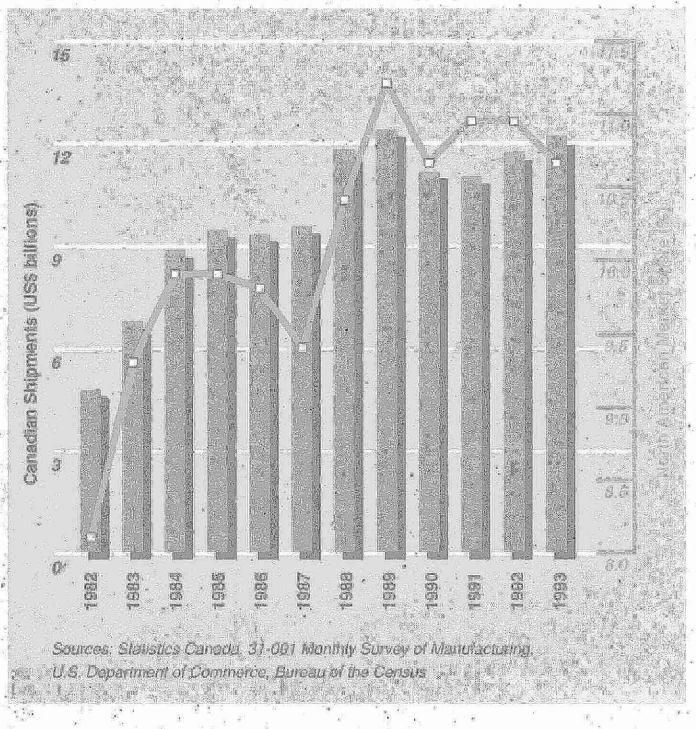
Ontario is home to a highly competitive and growing automotive parts industry.

More than 95 percent of the value of Canadian automotive parts shipments come from Ontario plants.

Approximately 85 percent of Ontario's production of automotive parts is exported to the United States.

Canadian exports of automotive parts to the United States have been growing at a faster rate than the North American market over the last ten years. As a result, Ontario-based automotive parts manufacturers have been increasing their share of the North American market.

Canadian Automotive Parts Shipments and North American Market Share



Sources: Statistics Canada, 31-001 Monthly Survey of Manufacturing
U.S. Department of Commerce, Bureau of the Census

Access to Key Markets

Ontario provides a gateway with close proximity to most major markets.

Suppliers of consumer products can reach more than one-half of the United States market in less than one day by road transport from facilities in southwest Ontario. This includes all major cities in the U.S. Northeast and mid-Atlantic regions.

For suppliers to the motor vehicle manufacturers, 58 of the 79 assembly plants in Canada and the United States are located within one day by road transport from facilities in southwest Ontario.

Investing in Ontario's ATF Industry

Ontario's advantages in brief

Key factors in nurturing a highly capable ATF industry in Ontario have been:

- Generous support for R&D, financial incentives to fleet and private operators to purchase alternative fuel vehicles.
- Generally lower costs of doing business in Ontario than competing jurisdictions.

Proof of the effectiveness of these advantages lies in the number of Ontario-based ATF companies that have become leading players in North America. They have taken advantage of the supportive environment to develop products and prove them in the discerning and competitive Ontario marketplace before entering other markets where they have also enjoyed considerable success.

Support for R&D is a keystone of Ontario's economy

All *high-tech* industries — including the ATF industry — spend heavily on R&D, especially during their early stages of development. Government and private sector support for R&D over the past 10 years has fuelled the growth and development of the industry.

The after-tax cost of performing R&D in Ontario is significantly lower than in any of the G-7 nations. Unlike most jurisdictions, capital costs for scientific research and experimental design do not have to be capitalized in Canada. They can be deducted in full during the year in which they are incurred.

The federal government provides a tax credit of 20 percent of eligible R&D expenses. In 1994, the Government of Ontario introduced an *innovation tax credit* that further reduces the cost of performing R&D by 10 percent. As a result of these measures, the after tax cost of doing $1.00 of R&D in Ontario is about 47 cents.

The cost of performing ATF R&D in Ontario is further reduced by direct funding of product development and commercialization by governments and fuel suppliers. A number of federal and provincial government ministries, notably Natural Resources Canada, Transport Canada, Ontario's Ministry of Environment and Energy, and Ministry of Transportation of Ontario, and fuel suppliers jointly and individually fund ATF R&D programs.

Market conditions favour superior product development

Ontario incentives to purchase ATF vehicles take the form of provincial sales tax rebates to offset the initial costs of acquiring alternative fuel vehicles and lower fuel taxes on ATFs than conventional fuels.

However, there are no government mandates that specify the minimum number of alternative fuel vehicles that fleet operators must purchase.

In other words, nobody is compelled to buy an alternative fuel vehicle in Ontario. The market is driven by economics and the competitiveness of the products. These factors have created a demanding and discerning market over the last ten years. These are ideal conditions for developing and proving new ATF products before venturing into bigger markets where the risks of marketing products that are not thoroughly proven are greater.

Related and supporting industries provide a cluster of expertise

Ontario is home to the second-largest automotive industry in North America after Michigan. The related and supporting industries that have developed in Ontario to serve the motor vehicle assemblers and automotive parts manufacturers are ideally suited to serving the ATF industry.

Investing in Ontario's ATF Industry

Ontario universities and private institutions boast established centres of excellence in product development, materials R&D, and manufacturing technology development for the automotive industry.

In addition, Ontario has an extensive base of suppliers of materials, manufacturing equipment, tools and dies, and other goods and services that meet the demand cost, quality and delivery standards of the automotive industry.

The automotive and related and supporting industries have created a huge pool of highly-trained workers from which the ATF industry can draw.

Ontario has among the best-developed infrastructure in North America to support alternative fuel vehicle operators. Propane is widely available throughout Ontario. Natural gas is available at public and private refuelling stations throughout southern and eastern Ontario, where most of the province's population lives and fleets are concentrated.

Parts and services to convert motor vehicles to propane or natural gas are available through a network of installation shops. Community colleges offer training courses for technicians who retrofit and service ATF vehicles.

Industry leaders promote continuous innovation from suppliers

Ontario has produced a number of leaders in the ATF industry. Among these are:

Chrysler Canada Limited:
Development and manufacturing of natural gas, methanol and propane light duty vehicles.

FuelMaker Corporation:
Development and manufacturing of natural gas vehicle refuelling appliances for home and commercial use.

General Motors of Canada Limited:
Development and manufacturing of flexible-fuel (methanol and gasoline) and bi-fuel (natural gas-gasoline) passenger cars.

GFI Control Systems Inc.:
Development and manufacturing of gaseous fuel injection systems for natural gas and propane.

Ontario Bus Industries:
Development and manufacturing of natural gas transit buses.

ORTECH Corporation:
Research and development of ATF engine systems.

Sherex/OPW Inc.:
Development and manufacturing of couplings for natural gas refuelling equipment.

These and other companies form a network of linked firms within the industry. The co-operative and competitive interplay of these companies stimulates continuous innovation. Continuous innovation contributes to improving product quality or reducing costs; raising a company's value-added; seeking better methods in marketing, financing or manufacturing processes. It helps create new business opportunities and sustain existing ones.

The cost of doing business in Ontario

Perhaps the most attractive feature of investing in Ontario's ATF industry is that the benefits described above come at no additional cost. As shown in the next few pages, the costs of doing business in Ontario are very competitive.

Doing Business in Ontario

Inflation is stable and low.

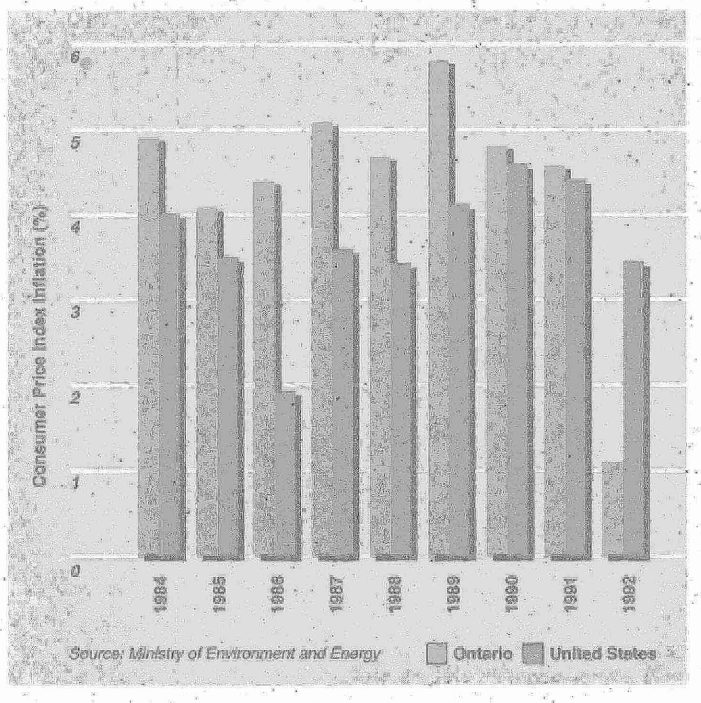
Historically, Canada has had the second lowest rate of inflation, after Japan, of the G-7 nations. In recent years, Canada's inflation rate has been comparable to the United States, tracking the U.S. rate at a slightly higher level.

Manufacturing corporate income taxes are competitive.

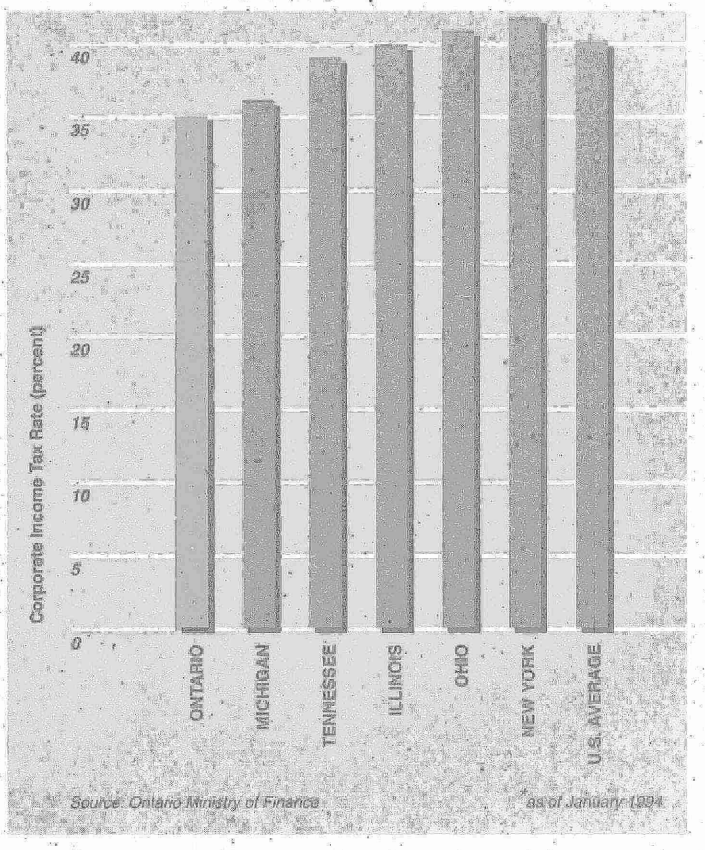
The corporate income tax rate for manufacturers is lower in Ontario than in competing US states.

Recent changes in corporate income taxes have lowered the combined tax rate for manufacturers to 35.3 percent from 38.3 percent.

Increase in Consumer Prices in Canada and U.S.



Highest Combined Federal and Provincial/State Corporate Income Tax Rate*



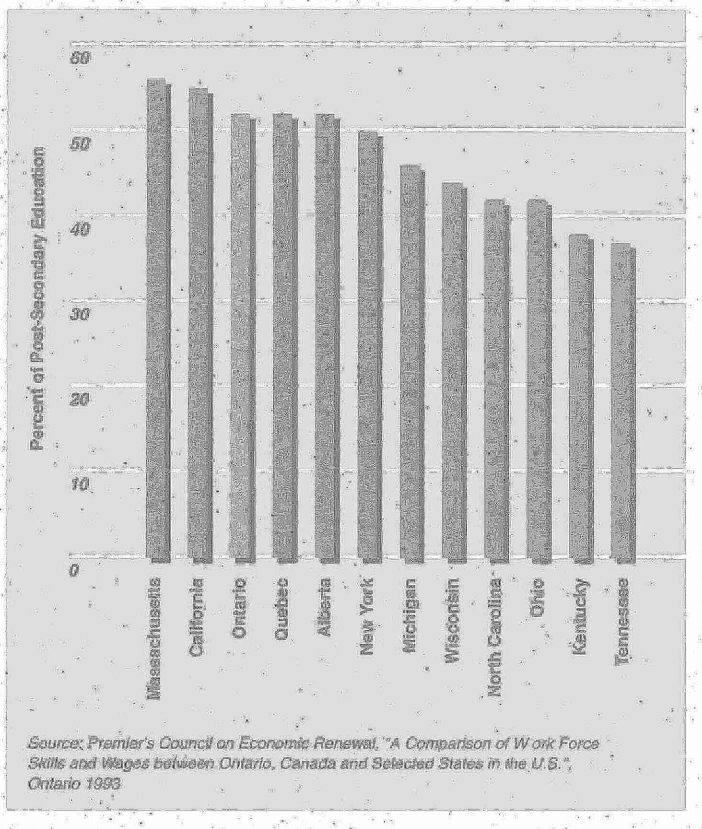
Doing Business in Ontario

Ontario has an educated workforce: the portion of the work force with some post-secondary education is higher than competing jurisdictions.

Approximately 52 percent of Ontario's work force has some post-secondary education.

Raising overall education levels is a priority in Ontario. The share of Ontario's manufacturing work force with some post-secondary education rose by 14 percent between 1980 and 1991 compared to 12 percent in New York, 10 percent in California, 6 percent in Kentucky and 4 percent in Tennessee.

Share of the Work Force with some Post-Secondary Education, 1991



Source: Premier's Council on Economic Renewal, "A Comparison of Work Force Skills and Wages between Ontario, Canada and Selected States in the U.S.", Ontario 1993

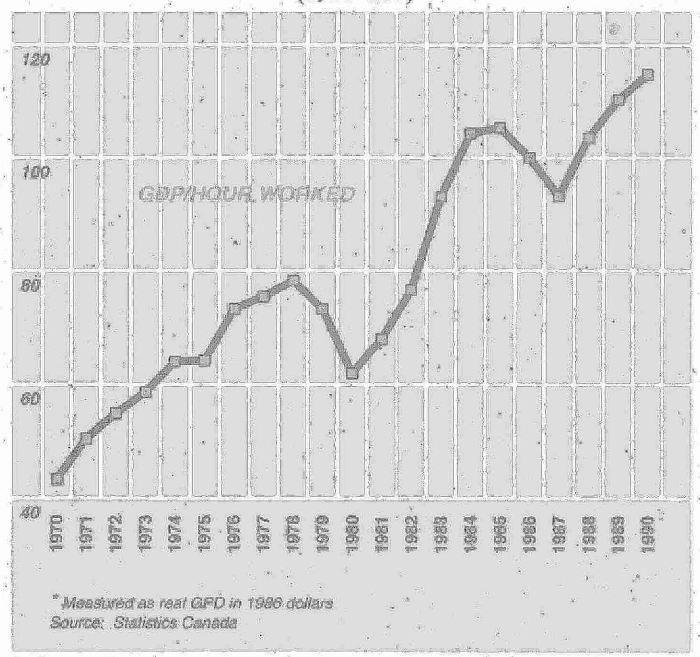
Robust growth in labour productivity has kept unit labour costs competitive.

Labour productivity in the automotive parts industry grew at an average annual rate of more than 4 percent between 1970 and 1990.

Increased productivity and lower unit labour costs have been a major factor in the growth of Canada's share of North American automotive parts shipments from 8.1 percent in 1982 to 10.8 percent in 1993.*

** Source: Statistics Canada and US Department of Commerce.*

Index of Output* per Hour Worked in the Automotive Parts Industry (1986=100)



*Measured as real GPD in 1986 dollars
Source: Statistics Canada

Doing Business in Ontario

Labour costs are lower in Canada than in the United States.

Hourly compensation costs are lower in Canada than in the United States due largely to the lower value of the Canadian dollar and lower costs of employee benefits.

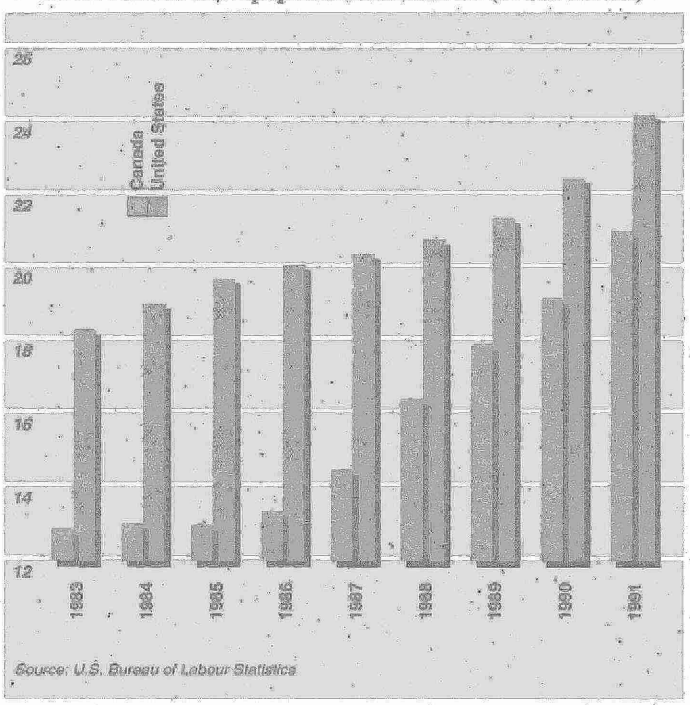
Employee benefits account for 24.5% of hourly compensation costs in Canada's automotive parts industry and 31.4%* in the United States.

** Source: Booz Allen and Hamilton Inc. and Pilorusso Research Associates Inc., "A Comparative Study of the Cost Competitiveness of the Automotive Parts Manufacturing Industry in Canada", 1990.*

Energy costs in Ontario are among the lowest in North America.

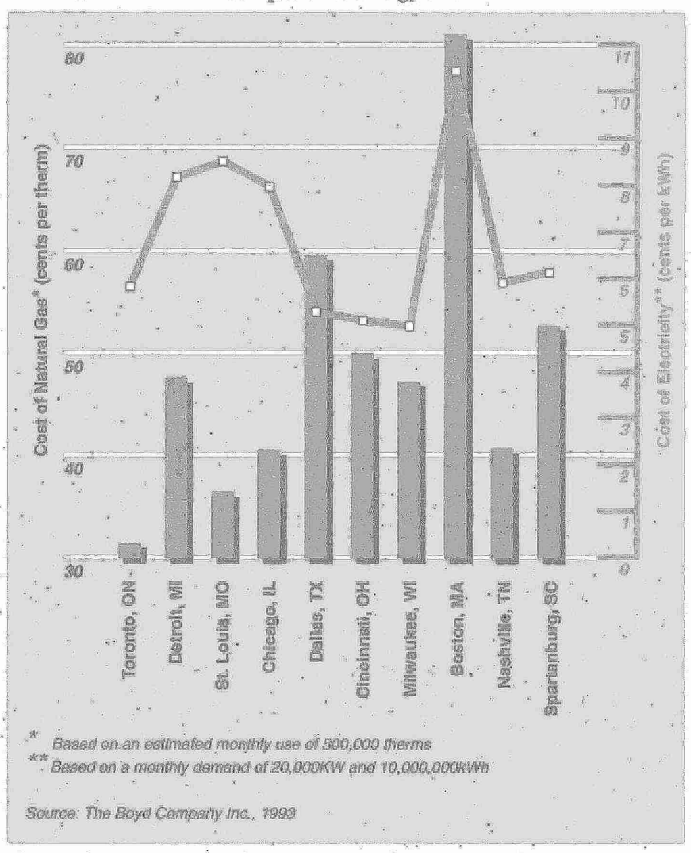
Ontario has one of the most reliable and low-cost energy supplies on the continent. Although electricity rates have risen recently, Ontario Hydro — the provincial Crown Corporation which generates the bulk of Ontario's electricity — froze rates in 1994 at 1993 levels and has pledged to hold increases to the rate of inflation until the year 2000.

Hourly Compensation Costs for Production Workers in Motor Vehicles and Equipment Manufacturers (in U.S. dollars)



Source: U.S. Bureau of Labour Statistics

Comparative Energy Costs



* Based on an estimated monthly use of 500,000 therms
** Based on a monthly demand of 20,000KW and 10,000,000KWh

Source: The Boyd Company Inc., 1993

Index of Companies

Vehicle Component Suppliers

Vehicle Manufacturers

Refueling Station Equipment Suppliers

Fuel Suppliers

Service Suppliers

Research, Development and Testing

Vehicle Component Suppliers

Diversco Supply Inc.

120 Shearson Crescent
Cambridge, Ontario
N1T 1J4

Telephone No.:
(519) 740-1210
Facsimile No.:
(519) 740-7303

Key Officers:
Jon Huddle
Bob Statham

Branches:
Calgary, Alberta
Montreal, Quebec

Human Resources:
Total Employees: 30

Alternative Transportation Fuels Products and Services:
Distributor of Sherwood valves for propane and natural gas vehicles

Sales of ATF Products and Services:
Major Customers: conversion centres and gas utilities

Customer Service Programs:
Training, technical support

Vehicle Component Suppliers

Fairview Fittings & Manufacturing Ltd.

449 Attwell Drive
Etobicoke, Ontario
M9W 5C4

Telephone No.:
(416) 675-4233
Facsimile No.:
(416) 675-9416

Key Officers:
Ken MacKenzie
(Vice President, Sales)
Jeff Woodward
(Vice President, Marketing)
John Urbanski
(Vice President, Operations)
Contact:
Ken MacKenzie

Human Resources:
Total employees: 125
Management: 9
Engineering/Technical: 3
Administrative: 15
Plant: 98

Alternative Transportation Fuels Products and Services:
Valves, propane hose assemblies, clamps, hose tubing, brass and steel fittings

Testing and Certification Standards:
CGA, UL

Sales of ATF Products and Services:
Annual sales: $1 million

Manufacturing Resources:
Plant size: 50,000 square feet

Vehicle Component Suppliers

GFI Control Systems Inc.

At GFI our vision is to meet or exceed the environmental requirements of our customers worldwide by offering innovation gaseous fuel solutions of the highest quality and value.

100 Hollinger Crescent
Kitchener, Ontario
N2K 2Z3

Telephone No.:
(519) 576-4270
Facsimile No.:
(519) 576-7045

Key Officers:
Lloyd Austin
(President)
Satya Syngal
(Vice President)
Contact:
Tom McIver
(Sales & Contracts Manager)

Parent Co.:
Devtek Corp., Stewart & Stevenson Services Inc.

Human Resources:
Total Employees: 76
Management: 9
Engineering/Technical: 17
Administrative: 20
Plant: 30

Alternative Transportation Fuels Products and Services:
CNG & propane conversion systems
CNG tank valves
High pressure CNG regulators

Testing and Certification Standards:
AGA/CGA system and component certifications, C.A.R.B., Colorado Department of Health, Texas Railroad Commission

Sales of ATF Products and Services:
Annual Sales: 10 million
Percent Exported: 95%
Major Customers: Ford Motor Co., Chrysler Corp., Detroit Diesel Corp., Herculles Engine Co., NGV Technologies Co., Consumer Gas, Union Gas

Main Export Markets:
United States, Great Britain, Australia, Argentina, Korea

Customer Service Programs:
Training, technical support, spare parts

Manufacturing Resources:
Engineering/technical systems: CAD/CAM, Auto. CAD
Manufacturing control systems: Symix MIS system
Quality Standards: ISO 9001, NATO AQAP-1, MIL-Q-9858A
Plant Size: 36 000 square feet
Automated/Specialized Manufacturing Systems: CNC machining centres, CNC CMM machine, automated test equipment, AGA certified laboratory

ATF Research and Development :
R & D expenditure as a percent of sales: 15
Number of employees in R & D: 15
Specialized facilities and equipment: service centre with dynamometer and vehicle analyzing equipment, calibration facilities

Capabilities / Achievements
National Energy Resources Organization Research and Development Award for 1993

Vehicle Component Suppliers

Interquip

Interquip's mission is to be by far the best distributor of compressed gas handling equipment and systems in Canada.

1870 Courtney Park Drive
East
Mississauga, Ontario
L5T 1W1

Telephone No.:
(905) 564-2428
Facsimile No.:
(905) 564-9491

Key Officers:
Mel Young (Vice President)
Contact:
D. Lahie (Branch Manager)

Parent Co.:
RNG Equipment Inc., Ontario
Branches:
Coquitlam, Edmonton, Calgary, Winnipeg, Mississauga, Montreal

Human Resources:
Total Employees: 13
Management: 1
Sales/Technical: 3
Administrative: 1
Sales: 8

Alternative Transportation Fuels Products and Service:
Vialle Autogas Systems
Century Alternate Fuel Systems
Motor fuel tanks

Testing and Certification Standards:
CGA/UL, ULC/UL, ASME

Sales of ATF Products and Services:
Major Customers: independent conversion dealers

Customer Service Programs:
Training, technical support, 1-800 tech/sales line

Vehicle Component Suppliers

Inverpower Controls Ltd.

Inverpower Controls' aim is to be the leading manufacturer of electronic power systems for efficient conversion of electrical energy.

835 Harrington Court
Burlington, Ontario
L7N 3P3

Telephone No.:
(905) 639-4692
Facsimile No.:
(905) 639-0961

Key Officers:
Dr. S.B. Dewan
(President)
A.S. Popp
(Marketing Manager)
Contact:
J. Rajda
(Product Manager)

Human Resources:
Total Employees: 125
Management: 10
Engineering/Technical: 25
Administrative: 20
Plant: 70

ATF Research and Development:
R & D expenditures as a percent of sales: 25
Number of employees in R & D: 15

Alternative Transportation Fuels Products and Services:
Automotive propulsion drives and power conditioners

Testing and Certification Standards:
Awarding of certification in process

Sales of ATF Products and Services:
Annual Sales: prototype samples
Major Customers: Fuel cell and bus manufacturers

Main Export Markets:
USA

Customer Service Programs:
Technical support for system integration

Manufacturing Resources:
Quality standards: CSA, IEEE
Plant size: 60,000 square feet

Specialized Facilities and Equipment:
Microlab for control SW development
Test equipment for product design evaluation.

Capabilities / Achievements
Unique power electronics based product development capabilities, supply products throughout the world.

Vehicle Component Suppliers

Manchester Tank and Equipment Ltd.

Manchester Tank is absolutely committed to provide our customers defect free products and services that meet all mutually agreed upon requirements, on time, in partnership with our suppliers and employees.

105 Spruce Street
Box 511
Tillsonburg, Ontario
N4G 4J1

Telephone No.:
(519) 842-9081
Facsimile No.:
(519) 842-3414

Key Officers:
Darrel Reifschneider (CEO)
Rob Reifschneider (Senior Vice President)
Ben Sampson (Vice President, Manufacturing)
Contact:
Walt Lileikis

Parent Co.:
Brentwood, Tennessee

Human Resources:
Total Employees: 91
Management: 4
Engineering/Technical: 1
Administrative: 6
Plant: 80

Alternative Transportation Fuels Products and Services:
Propane Motor Fuel/RV Tanks
Percent Exported: 20%
Major Customers: Gas Equipment Supplies, Interquip Division of RNG

Main Export Markets:
USA

Testing and Certification Standards:
ASME, National Board of Boiler and Pressure Vessel Inspectors, Ontario Ministry of Consumer and Commercial Relations

Manufacturing Resources:
Engineering/Technical Systems: CD
Manufacturing Control Systems: MRP II
Quality Standards: TQM/ASME
Plant Size: 45,000 square feet

ATF Research and Development:
Handled by parent company

Vehicle Component Suppliers

S.C.M. Technologies

PO Box 1000
97 Lyon Avenue North
Tilbury, Ontario
N0P 2L0

Telephone No.:
(519) 682-1313
Facsimile No.:
(519) 682-3630

Key Officers:
James G. Marsh
(President)
Contact:
Peter Thorpe

Human Resources:
Total Employees: 78
Management: 5
Engineering/Technical: 5
Administrative: 8
Plant: 60

SCM Technologies will design, engineer and manufacture the finest quality gas cylinder and related components for the packaged gas industry. We use the highest calibre personnel, research, materials, and processes to ensure that our products are at the forefront of technology. Our goal is to deliver these world class products on time and at competitive prices with the highest levels of customer service and integrity thus ensuring customer satisfaction and steadily increasing profits and shareholder returns.

Alternative Transportation Fuels Products and Services:
Lightweight high strength steel cylinders for NGV

Testing and Certification Standards:
NGV-1, NGV-2, CSA B51

Sales of ATF Products and Services:
Annual Sales: $100,000
Percent Exported: 20
Major Customers: Natural Gas Utilities

Main Export Markets:
USA, Mexico

Manufacturing Resources:
Engineering/Technical Systems: CAD
Quality Standards: US DOT, Transport Canada
ISO 900 2 standard pending
Plant Size: 32,000 square feet
Automated/specialized manufacturing systems:
deep drawing and ironing, hot spinning, heat treating

ATF Research and Development:
R&D expenditures as a percent of sales: 2.7
Number of Employees in R & D: varies

Vehicle Component Suppliers

Sherex/OPW Inc.

4180 Morris Drive
Burlington, Ontario
L7L 5L6

Telephone No.:
(905) 639-9400
Facsimile No.:
(905) 639-9537

Key Officers:
Joe Scherer
(General Manager)
John Heenan
(Vice President, Marketing)
Andrew Johnson
(Secretary Treasurer)

Contact:
John Heenan

Parent Co.:
Joint Venture -
Sherex Industries Limited
and
OPW Fuelling Components

Subsidiary/Affiliated Co.:
Sherex Europe A/S -
Copenhagen, Denmark

Human Resources:
Total Employees: 20
Management: 1
Engineering/Technical: 10
Administrative: 2
Plant: 7

Sherex/OPW is a leading designer, manufacturer and marketer of high quality, engineered pressure components for Alternative Transportation Fuel Vehicle markets worldwide. We will grow by pursuing leading-edge technology opportunities; providing unique engineering solutions and becoming a low cost producer through advanced manufacturing techniques. We provide an environment in which our employees are encouraged to develop their skills, work as a team, and are recognized and rewarded for their contributions.

Alternative Transportation Fuels Products and Services:
NGV refuelling nozzles, NGV refuelling receptacles, NGV dispenser storage receptacles, NGV check valves, pressure tight protective caps, in-line filters, precision two-stage NGV pressure regulator, precision three-stage NGV pressure regulator
Options: High pressure solenoid, fuel pressure sensor, cranking solenoid, idle solenoid, three-stage shutt-off and power valve.

Testing and Certification Standards:
Accredited laboratory re certification by International Approval Services (IAS) - AGA/CGA NGV1, TUV - Druckbehv ASME, Texas Railroad Commission

Customer Service Programs:
Training,
Technical Support,
Repair Depots - Canada USA and Western Europe

Capabilities / Achievements
Bus nozzle (very high flow, high pressure)
Pressure tight protective cap
2 and 3 stage regulators (pressure)

Vehicle Manufacturers

Chrysler Canada Ltd.

P.O. Box 1621
Windsor, Ontario
N9A 4H6

Telephone No.:
(519) 973-2719
Facsimile No.:
(519) 973-2895

Key Officer:
S.R. Perkens
(Director of Engineering)
Contact:
J.L Mann (Manager, Product Engineering and Development)

Parent Co.:
Chrysler Corporation

Human Resources in the ATF Program:
Total Employees: 50
Management: 4
Engineering/Technical: 30
Administrative: 1
Plant: 15
Number of employees in ATF R&D: 50

Annual R & D Expenditures:
$8 million

Customer Service Programs:
Training, technical support, repair depots, marketing programs.

Chrysler Canada Ltd.'s mission is to produce cars and trucks that people will want to buy, will enjoy driving, and will want to buy again.

Alternative Transportation Fuels (ATF) Vehicle Production

Fuel Type:	Model, Engine Type & Displacement:	Number of Units Produced:	Province/State Produced:	Percent Exported:
Natural Gas	Dodge Ram Van/Wagon, 5.2 L V8 engine	495 (1993 model) 1100 (1994 model)	Ontario	99%
Natural Gas	Dodge Caravan Plymouth Voyager, 3.3L V6 engine	400 (1994 model)	Ontario	100%
Electric	Dodge Caravan Plymouth Voyager	56 (1993 model) 8 (1994 model)	Ontario	97%
Methanol	Dodge Spirit FFV Plymouth Acclaim 2.5L 4 cyl. MPI	5600 (1993 model) 4500 (1994 model)	Illinois	1%
Methanol	Chrysler Intrepid FFV 3.3L V6 MPI	100(1994 model)	Ontario	25%

ATF Research and Development Programs in Ontario:

Fuel Type:	Model, Engine Type & Displacement.:	Scheduled Completion Date:	Target Markets:
Propane	Dodge Ram Van/Wagon 5.2L V8 engine		Canada
Natural Gas	Dodge Ram Pickup 5.2L V8 engine	October 1994	North America
Natural Gas	Dakota Pickup 5.2L V8 engine	October 1994	North America
Bi-fuel gasoline/CNG	Dakota Pickup 5.2L V8 engine		
Methanol (M85)	Passenger Car 2.5L & 3.3L V6	Summer 1994	North America

Capabilities / Achievements
CANMET Award for Technology Transfer, June 1993

Vehicle Manufacturers

Ford Motor Company of Canada Ltd.

Working together, our employees, dealers and suppliers successfully meet the challenges of ingenuity and global competition by improving customer satisfaction, increasing sales and market share, and successfully launching new products.

The Canadian Road
Oakville, Ontario
L6J 5E4

Telephone No.:
(905) 845-2511
Facsimile No.:
(905) 844-1198

Key Officer:
R. Bright (Director, Environmental Affairs)
Contact:
C. Banks (Public Affairs)

Parent Co.:
Ford Motor Company

Customer Service Programs:
Service support through dealers, regional training programs for fleets as required.

Alternative Transportation Fuels (ATF) Vehicle Production			
Fuel Type:	Model, Engine Type & Displacement:	Number of Units Produced:	Province/State Produced:
Natural Gas	Crown Victoria;	(planned for 1996)	Ontario

ATF Research and Development Programs in Ontario:			
Fuel Type:	Model, Engine Type & Displacement:	Field Testing:	Target Markets:
Electric	Ecostar Van	1994-1997	North america

Vehicle Manufacturers

General Motors of Canada Ltd.

General Motors of Canada's goal is to provide engineering leadership and resources to corporate alternative fuels programs with specific focus on powertrain controls design.

1908 Colonel Sam Drive
Oshawa, Ontario
L1H 8P7

Telephone No.:
(905) 644-4171
Facsimile No.:
(905) 644-4932

Key Officers:
John M. Christie
Terry W. Ostapiuk
Contact:
John M. Christie

Parent Co.:
General Motors Corporation

Human Resources:
Total Employees: 30
Management: 4
Engineering/Technical: 25
Administrative: 1

Annual R&D Expenditures:
$4.5 million
Number of employees in R&D: 30

Alternative Transportation Fuels (ATF) Vehicle Production

Fuel Type:	Model, Engine Type & Displacement:	Number of Units Produced:	Province/State Produced:	Percent Exported:
M85	Lumina 3.1L V6	500 (1993 model)	Ontario	100%

ATF Research and Development Programs in Ontario:

Fuel Type:	Model, Engine Type & Displacement:	Scheduled Completion Date:	Target Markets:
Alcohol FFV	4 CYL	September 1996	Canada and USA

Capabilities / Achievements
First EPA certified alternative fuel vehicle - 1990 Chevrolet Lumina VFV.

Vehicle Manufacturers

Ontario Bus Industries Inc.

Ontario Bus Industries' goal is to lead the industry in innovation and quality towards the next generation of transit buses.

5395 Maingate Drive
Mississauga, Ontario
L4W 1G6

Telephone No.:
(905) 625-9510
Facsimile No.:
(905) 625-5218

Key Officers:
Peter Reinlaender
(Vice President, Engineering)
Tom Powell (Manager,
R&D Engineering)
John Riet
(Project Manager, ATF)
Contact:
Tom Powell

Subsidiary/Affiliated Co.:
Bus Industries of America Inc.

Human Resources in the ATF Program:
Total Employees: 400
Management: 1
Engineering/Technical: 5
Administrative: 2
Plant: 400
Number of employees in ATF R&D: 45

Annual R&D Expenditures:
$2 million

Alternative Transportation Fuels (ATF) Vehicle Production

Fuel Type:	Model, Engine Type & Displacement:	Number of Units Produced:	Province/State Produced:
CNG	Cummins L10	180 (1993 model) 200 (1994 model)	Ontario / New York
CNG	Teco Gen/GM427	40 (1994 model)	Ontario / New York
CNG	DDC Series 50	40 (1994 model)	Ontario / New York

ATF Research and Development Programs in Ontario:

Fuel Type:	Model, Engine Type & Displacement.:	Scheduled Completion Date:	Target Markets:
LNG	Cummins L10	September 1994	North America
CNG/Hybrid	Cummins B	Mid 1995	North America

Customer Service Programs:
Specialized ATF training programs for transit operators.
Technical assistance to operators and maintenance.

Capabilities / Achievements
Leader in alternative fuel and hybrid technology for transit buses in North America.
More than 20 million miles experience on CNG transit buses.

Vehicle Manufacturers

Overland Custom Coach Inc.

Overland Custom Coach's mission is to provide design and engineering leadership in small and mid-size buses serving North American communities.

R.R. #2
PO Box 128
Thorndale, Ontario
N0M 2P0

Telephone No.:
(519) 461-1140
Facsimile No.:
(519) 461-0523

Key Officers:
Ray Dries (President)
Joe Dries (Vice President)
Contact:
Jerry Elmquist

Subsidiary/Affiliated Co.:
Overland Custom Coach Inc. - USA
General Coach - Canada

ATF Research and Development:
Annual R&D Expenditures: $150,000
Number of employees in R&D: 2-4

Alternative Transportation Fuels (ATF) Vehicle Production

Fuel Type:	Model, Engine Type & Displacement:	Number of Units Produced:	Province/State Produced:	Percent Exported:
CNG	Ford/Gas/460	2 (1993 model)	Ontario	0%
LPG	Ford/Gas/460	1(1994 model)	Ontario	0%
CNG	Ford/Gas/460	11 (1994model)	Michigan	0%

ATF Research and Development Programs in Ontario:

Fuel Type:	Model, Engine Type & Displacement.:	Scheduled Completion Date:	Target Markets:
CNG	Ford/Gas/460	July 1994	North America
LPG	Ford/Gas/460	July 1994	North America

Refueling Station Equipment Suppliers

Clemmer Industries Ltd.

Clemmer Industries provides technical and product excellence in the storage tank industry.

446 Albert St.
Waterloo, Ontario
N2J 4A1

Telephone No.:
(519) 884-4320
Facsimile No.:
(519) 884-6623

Key Officers:
Elson Fernandes
(Manager of Technical Service)
Doug Scheifley
(Sales Manager)
Contact:
Doug Scheifley

Parent Co.:
Meridian Technologies

Human Resources:
Total Employees: 95
Management: 10
Engineering/Technical: 6
Administrative: 12
Plant: 67

ATF Research and Development:
R&D and expenditures as a percent of sales: 10%
Number of employees in R&D: 1

Alternative Transportation Fuels Products and Services:
M-85 fuel infrastructure systems
Propane fuel infrastructure systems
(All systems available as turnkey operations)

Testing and Certification Standards:
ULC, CSA, CSA National Board

Sales of ATF Products and Services:
Annual sales: $ 100,000
Major customers: Canadian Oxygenated Fuels Association

Customer Service Programs:
Consulting, technical support, sales support, design

Manufacturing Resources:
Engineering/technical systems: finite element analysis, CAD
Manufacturing control systems: Z-299.3 1984, QC department.
Quality standards: Z-299.3 1984
Plant size: 145 000 square feet

Capabilities / Achievements

Hydrogen sulphide road transport containers;

Propane unitized ocean transport containers;

Vacuum monitored double wall pressure vessel tanks (above and below ground).

Refueling Station Equipment Suppliers

Fiba Canning Inc.

Fiba Canning Inc.'s goal is to supply and develop the market for utilization of natural gas to replace petroleum to power vehicles; to supply the technology and equipment to control and deliver natural gas from the source gas main to the point of consumption.

2651 Markham Road
Scarborough, Ontario
M1X 1M4

Telephone No.:
(416) 299-1142
Facsimile No.:
(416) 299-0349

Key Officer:
Hugh Canning (President)

Human Resources:
Total Employees: 33
Management: 4
Engineering/Technical: 4
Administrative: 4
Plant: 20

Alternative Transportation Fuels Products and Services:
Trailers to transport natural gas in liquid or compressed gaseous form.
Natural gas loading and refuelling facilities.

Sales of ATF Products and Services:
Annual Sales: $1 million
Percent Exported: 10%
Major Customers: Soquip, Consumers Gas

Customer Service Programs:
Commissioning and training of operators provided with all equipment supplied.

Manufacturing Resources:
Engineering/Technical System: yes
Manufacturing Control Systems: yes
Quality Standards: meet all North American codes
Plant Size: 20,000 square feet

ATF Research and Development:
R & D expenditure as a percent of sales: 10%
Number of employees in R & D: 3
Specialized facilities and equipment: acoustic emission and hydrostatic cylinder testing.

Refueling Station Equipment Suppliers

FuelMaker Corporation

FuelMaker is committed to manufacturing the most innovative refueling products to provide convenient, on-site natural gas refueling.

70 Worcester Road
Toronto, Ontario
M9W 5X2

Telephone No.:
(416) 674-3034
Facsimile No.:
(416) 674-3042

Key Officers:
John Lyon
(President and CEO)
David Archbold
(VP Marketing and Sales)
Rod Crawford
(VP Finance)

Contact:
Stewart Laszlo
(Product Manager)

Subsidiary/Affiliated Co.:
FuelMaker Inc., USA

Human Resources:
Total Employees: 73
Management: 5
Engineering/Technical: 20
Administrative: 5
Plant: 20

Alternative Transportation Fuels Products and Services:
FM4 Vehicle Refueling Appliance
FF300 Fast-Fill Storage System
R410 Remote Refuelling Panel

Testing and Certification Standards:
Canadian, American, German Gas Associations

Sales of ATF Products and Services:
Percent Exported: 45%
Major Customers: Union Gas, Consumers Gas, Ohio Transmission & Pump Company

Main Export Markets:
Ohio, Utah, California, Georgia, Switzerland

Customer Service Programs:
Technical service programs, sales training programs

Capabilities / Achievements

Certified by the City of Los Angeles.

FuelMaker is a member of the Natural Gas Vehicle Coalition and the International Association for Natural Gas Vehicles.

Refueling Station Equipment Suppliers

Ingersoll-Rand Canada Inc.

Ingersoll-Rand will supply products and services that consistently meet the requirements of our customers and each other.

2360 Millrace Court
Mississauga, Ontario
L5W 1W2

Telephone No.:
(905) 858-8480
Facsimile No.:
(905) 858-7685

Key Officers:
S.J. ZalZal
(President)
S.G. Hamam
(General Manager)
Contact:
B.A. Crawford

Parent Co.:
Ingersoll-Rand Company

Alternative Transportation Fuels Products and Services:
Vehicle refuelling systems

Sales of ATF Products and Services:
Annual Sales: $1 million
Percent Exported: 0%
Major Customers: utilities

Customer Service Programs:
Training school, National Service Network

Refueling Station Equipment Suppliers

Kingsleigh Industrial Company Ltd.

185 Nipissing Road
Milton, Ontario
L9T 1B3

Telephone No.:
(905) 878-3502
Facsimile No.:
(905) 878-6937

Contacts:
Ken Hartig
(Quality Control Manager)

Human Resources:
Total Employees: 10
Management: 3
Engineering/Technical: 1
Administrative: 1
Plant: 5

Alternative Transportation Fuels Products and Services:
LPG pressure vessels fabrication

Testing and Certification Standards:
MCCR pressure vessel, ASME, NB and Transport Canada

Sales of ATF Products and Services:
Annual Sales: <$500,000
Percent Exported: 0
Major Customers:
ICG Propane, Superior Propane, Petro Canada, Dupont

Customer Service Programs:
Technical support, repair depots, LPG service centre and repair

Manufacturing Resources:
Engineering/Technical Systems:
ESDU pressure vessel design program
Quality Standards:
QC manual in accordance with ASME section VIII
Plant Size: 10,000 square feet
Automated/Specialized Manufacturing Systems:
Submerged arc welding, plate rolling, shearing, braking

Capabilities / Achievements
Accreditations with:
Ontario Ministry of Consumer and Commercial Relations,
National Board of Boiler and Pressure Vessel Inspectors,
American Society of Mechanical Engineers,
(U Stamp)

Refueling Station Equipment Suppliers

Kraft Fuels/Alternate Fuels Technology Inc.

50 Ritin Lane, Unit 20
Concord, Ontario
L4C 4C9

Telephone No.:
(905) 738-0287
Facsimile No.:
(905) 738-0931

Key Officers:
Franz Keiling (President)
Contact:
Franz Keiling

Alternative Transportation Fuels Products and Services:
LPG and NGV dispensers
Calibration and maintenance
Repairs
Upgrades

Testing and Certification Standards:
CSA, CGA

Sales of ATF Products and Services:
Annual Sales: < $1 million
Percent Exported: 20%
Major Customers: Superior Propane, Phillips 66, Sun Oil

Main Export Markets:
USA

ATF Research and Development:
Specialized facilities and equipment:
mobile PLG Prover

Refueling Station Equipment Suppliers

Sleegers Engineering Inc.

It is the responsibility of all employees of Sleegers Machining and Fabricating Inc. and Sleegers Engineering Inc. to provide a quality product to our customers in a responsible manner. Each employee to the best of his or her abilities is to ensure that all specifications, regulations and any other standards for the product are achieved or exceeded. Continuous product improvement is our goal.

980 Green Valley Road
London, Ontario
N6A 4C2

Telephone No.:
(519) 685-7444
Facsimile No.:
(519) 685-2882

Key Officer:
P.J. Sleegers (President)
Contact:
J.L. Adams

Alternative Transportation Fuels Products and Services:
Automotive propane vessels
Automotive propane dispensers
Propane storage tanks

Testing and Certification Standards:
ASME section VIII Div. I
CSA Z299.4

Manufacturing Resources:
Engineering/Technical Systems: Computer Aided Design
Quality Standards: ASME Section VIII, CSA Z299.4
Plant Size: 75,000 square feet

Refueling Station Equipment Suppliers

Sulzer Canada Inc.

Sulzer Canada's objective is to maintain our position as leader in NGV equipment through development and production of standardized, cost-effective and reliable refuelling equipment, and active marketing throughout North America.

60 Worcester Road
Rexdale, Ontario
M9W 5X2

Telephone No.:
(416) 674-2034
Facsimile No.:
(416) 213-1031

Key Officers:
J.C. Godel
(President)
P.L. Bovon
(General Manager, NGV)
Contacts:
P.L. Bovon
G. Stables

Parent Co.:
Sulzer Ltd.
Winterthur, Switzerland
Subsidiary/Affiliated Co.:
Sulzer USA Inc.-
Houston, Texas
Sulzer Burckhardt-
Basel, Switzerland

Human Resources:
Total Employees: 20

Alternative Transportation Fuels Products and Services:
Compressor Stations, Dispensers, Complete Refuelling Systems

Testing and Certification Standard:
Ontario MCCR
CSA
CCA
CTEP (California)

Sales of ATF Products and Services:
Annual Sales: >$5 million
Percent Exported: 75%
Major Customers: Consumers Gas, Union Gas, Tren-Fuels

Main Export Markets:
USA, Mexico

Customer Service Programs:
After-sales service, field service contracts, overhauls, valve repair shop, training

Manufacturing Resources:
Engineering/Technical Systems: CAD
Manufacturing Control System: SFC
Quality Standards: MCCR to CSA standards
Plant size: 10,000 square feet

ATF Research and Development:
Specialized facilities and equipment: Test bed for complete stations (480 V and 575 V) clean room (valve repair)

Capabilities / Achievements

No. 1 supplier of public NGV refuelling equipment in Canada. Affiliated with the Sulzer group providing world-wide support to the NGV industry.

First dispenser developed jointly with a major liquid fuel dispenser manufacturer (Gilbarco).

Refueling Station Equipment Suppliers

Wilson Technologies Inc.

Wilson Technologies' mission is to provide high quality, safe and reliable CNG (compressed natural gas) vehicle fueling stations for public and private fleets across North America.

244 Shoemaker Street
Kitchener, Ontario
N2E 3E1

Telephone No.:
(519) 894-9202
Facsimile No.:
(519) 894-9941

Key Officers:
Rob Adams
(East Coast President)
Murray Pennington
(Engineering Manager)
Contact:
Murray Pennington

Human Resources:
Total Employees: 30
Management: 6
Engineering/Technical: 22
Administrative: 1
Plant: 1

Alternative Transportation Fuels Products and Services:
Natural Gas Vehicle Refuelling Stations - design/build

Testing Certifications and Standards:
All applicable standards, depending on geographic region.

Sales of ATF Products and Services:
Annual Sales: $4 million
Percent Exported: 90%
Major customers: Brooklyn Union Gas, SoCal Gas, Boston Gas, Cleveland Regional Transit Authority, Toronto Transit Commission

Main Export Markets:
USA

Customer Service Programs:
Design/build, training (technical and safety), technical support, maintenance/service

Manufacturing Resources:
Engineering/Technical Systems: CAD
Quality Standards: as applicable

ATF Research and Development:
R & D expenditures as a percent of sales: 7%
Number of Employees in R & D: 2

Capabilities / Achievements
Designed and built North America's largest CNG transit refuelling station for Cleveland RTA.

Fuel Suppliers

Centra Gas Ontario Ltd.

Centra Gas Ontario's mission is to achieve the highest level of customer satisfaction by providing safe, reliable and economical natural gas service.

200 Yorkland Boulevard
North York, Ontario
M2J 5C6

Telephone No.:
(416) 491-1880
Facsimile No.:
(416) 496-5331

Key Officers:
R.D. Walker
(President)
M.F. Burton
(Vice President, Marketing)
W.M. Bingham
(Vice President, Regulatory)
Contact:
J. Oosterbaan

Parent Co.:
Westcoast Energy Inc.

Human Resources:
Total Employees: 1001
Management: 235
Engineering/Technical: 191
Administrative: 575

Type and Volume of Alternative Transportation Fuel:
Type of Fuel: Natural Gas
Quantity supplied in latest year: 176,860 cubic metres

Geographic Area Served:
Eastern and Northern Ontario

Number of Refuelling Stations Served:
Public Stations: 2
Private Stations: 8
Private with limited public access: 0
Vehicle Refueling Appliances: 65

ATF Research and Development:
R&D expenditures as a percent of sales: .015%
Number of Employees in R & D: 0 (full time)

Fuel Suppliers

Commercial Alcohols Inc.

Commercial Alcohols will strive to be the premier supplier of renewable ethanols to the Canadian market.

2 Chelsea Lane
Brampton, Ontario
L6T 3Y4

Telephone No.:
(905) 790-7500
Facsimile No.:
(905) 790-7700

Key Officers:
Douglas MacKenzie
(President)
Malcom West
(Vice President)
Gary McInerney
(Vice President)
Contact:
Douglas MacKenzie

Human Resources:
Total Employees: 49
Management/Sales: 6/6
Engineering/Technical: 4
Administrative: 5
Plant: 28

Type and Volume of Alternative Transportation Fuel:
Type of fuel: Ethanol
Quantity supplied in latest year: 6 million litres

Geographic Area Served:
Ontario

ATF Research and Development:
R & D expenditures as a percent of sales: 1%
Specialized facilities and equipment:
Laboratory and process equipment

Fuel Suppliers

Consumers Gas Company Ltd.

Consumer gas is committed to the development of Natural Gas for Vehicles (on and off-road) and is in the business of providing/distributing natural gas and natural gas related equipment.

500 Consumer Road
Scarborough, Ontario
M1K 5E3

Telephone No.:
(416) 495-5699
Facsimile No.:
(416) 495-8350

Key Officers:
Perry Stover (Director, NGV Business Development)
Contact:
Perry Stover

Human Resources:
Total Employees: 30
Management: 4
Engineering/Technical: 7
Administrative: 5
Plant: 14

Type and Volume of Alternative Transportation Fuel:
Type of Fuel: Natural Gas
Quantity supplied in latest year: 20 million cubic metres

Geographic Area Served:
Greater Toronto Area, Niagara Region, Ottawa and surrounding area

Number of Refuelling Stations Served:
Public Stations: 31
Private Stations: 17
Vehicle Refuelling Appliances: 380

Customer Service / Marketing Programs:
Technical service days - free vehicle checks
Natural Times - newsletter
NGV hotline
Fueling station operators:
NGV station signage
Spring station clean-up
Fall station clean-up

ATF Research and Development:
R & D expenditures as a percent sales: 6.5%

Capabilities / Achievements
Design and development of "turn-key" compressor facilities.
Complete conversion kits custom engineered for specific vehicle models/ applications.

Fuel Suppliers

ICG Propane Inc.

800A Denison Street
Markham, Ontario
L3R 5M9

Telephone No.:
(905) 477-3155
Facsimile No.:
(905) 477-9357

Key Officers:
Denys Turcotte
(General Manager)
Dave Paradis
(District Manager)
Contact:
Dave Paradis

Parent Company:
Petro-Canada

Human Resources:
Total Employees: 160
Management: 10
Engineering/Technical: 3
Administrative: 20
Plant: 127

Type and Volume of Alternative Transportation Fuel:
Type of Fuel: Propane
Quantity supplied in latest year: 225 million Litres

Geographic Area Served:
Canada

Number of Refuelling Stations Served:
Public Stations: 75 in Ontario

Fuel Suppliers

Liquid Carbonic Inc.

Liquid Carbonic's goal is to establish liquified natural gas (LNG) as the alternate fuel of choice for Canada's bus and truck fleets.

140 Allstate Pkwy
Markham, Ontario
L3R 5Y8

Telephone No.:
(416) 266-3161
Facsimile No.:
(416) 266-0639

Key Officers:
Sid Engler
(Sr. V.P. Marketing)
Danny Green
(Market Development Mgr.)
Contacts:
Danny Green

Parent Company:
CBI Industries Inc.

Human Resources:
Total Employees: 565
Management: 102
Sales/Engineering/
Technical: 93
Administrative: 113
Plant/drivers: 257

ATF Research and Development:
Number of Employees in R & D: 9

Type and Volume of Alternative Transportation Fuel:
Type of fuel: LNG

Geographic Area Served:
Canada

Number of Refuelling Stations Served:
Private stations: 1 (under development)
Private with limited public access: 1 (under development)

Customer Service/Marketing Programs:
LNG fuelling station and supply trial

Capabilities / Achievements
Custom design of LNG plants, fuelling stations and the supply of LNG to customer stations.

Fuel Suppliers

Methanex Corporation

Methanex Corporation is a world leader in the production and marketing of methanol and related products to service customers globally. Methanex has sought out strategic alliances within the industry to expand its international production capacity and marketing reach.

301 Plaza 1
2000 Argentia Road
Mississauga, Ontario
L5N 2R7

Telephone No.:
(905) 826-3299
Facsimile No.:
(905) 826-4620

Key Officers:
Brian Hannan
(CEO)
Brook Wade
(President)
Michael Wilson
(Vice President,
North America)
Contact:
Don Fitzsimons

Parent Company:
Methanex Corp. -
Vancouver, B.C.

Human Resources:
Total Employees: 1000

Type and Volume of Alternative Transportation Fuel:
Type of Fuel: Methanol
Quantity supplied in latest year: 1,950,000 litres

Geographic Area Served:
Canada

Number of Refuelling Stations Served:
Public Stations: 6
Private Stations: 6 (3 in Ontario)
Private with limited public access: 1

Customer service/Marketing Programs:
Current focus on municipal fleets and airport rental cars.
Canadian Oxygenated Fuels Association newsletter.
Canadian light-duty methanol vehicle program.

Fuel Suppliers

Superior Propane Inc.

Our mission at SPI is to lead the North American clean energy market with quality propane services and products which satisfy our customers' evolving energy needs. We will focus on adding value to our shareholder and providing challenge and reward for our employees and partners.

75 Tiverton Court
Unionville, Ontario
L3R 9S3

Telephone No.:
(905) 475-9200
Facsimile No.:
(905) 940-7562

Key Officers:
D.J. Edwards
(President and CEO)
T.I. MacDonald
(Senior Operating Officer)
T.A. Henry (Chief)
Contact:
J.W. Cooper
(General Manager, Ontario)

Parent Company:
Norcen Energy Resources Inc.

Human Resources:
Total Employees: 550-600

Type and Volume of Alternative Transportation Fuel:
Type of Fuel: Propane
Quantity supplied in latest year: 500-600 million litres (Ontario)

Geographic Areas Served:
Canada

Number of Refuelling Stations Served:
Public Stations: 700-750 (Ontario)
Private Stations: 300-350 (Ontario)

Customer Service/Marketing Programs:
No cost, no risk conversion program
Payment program tied to fuel savings
1200 free litres program
Refueling agents program
Site specific station promotions

Fuel Suppliers

Union Gas Ltd.

The Union Gas NGV business unit is commited to the delivery of a high-quality, cost-effective, convenient, and environmentally superior fuel alternatives to energy consumers in Union's transportation sector.

NGV Division
50 Keil Drive North
Chatham, Ontario
N7M 5M1

Telephone No.:
(519) 352-3100
Facsimile No.:
(519) 436-5257

Key Officers:
Paul Shervill (Manager, NGV Business Development)
David MacEacheron (Manager, NGV Transit)
Bryan Goulden (Manager, Operations)
Paul Paolatto (Manager NGV Fleets)

Contact:
Paul Paolatto

Parent Company:
Westcoast Energy Inc.

Subsidiary/Affiliated Company:
Trillium Alternative Fuels, Trillium, USA

Human Resources:
Total Employees: 32

Type and Volume of Alternative Transportation Fuel:
Type of Fuel: Natural Gas
Quantity supplied in latest year: 17.9 million cubic metres

Geographic Area Served:
Southwestern Ontario (from Windsor to Oakville to Owen Sound).

Number of Refueling Stations Served:
Public Stations: 25
Private Stations: 10
Vehicle Refueling Appliances: 1000

Service Suppliers

Trillium Alternative Fuels

Trillium will become a leader in the provision of marketing system design and engineering services to alternative transportation fuel customers across North America.

213 King Street West
2nd Floor
Chatham, Ontario
N7M 1E6

Telephone No.:
(519) 436-5444
(519) 436-5442

Key Officers:
Paul Shervill (President)
Contact:
Paul Shervill

Parent Co.:
Westcoast Energy Inc.

Subsidiary/Affiliated Co.:
Union Gas Ltd.
Trillium, USA

Alternative Transportation Fuels Products and Services:
Alternative fuel feasibility analysis,
Turn-key station design and engineering,
Vehicle technical services,
Maintenance

Research, Development and Testing

Cominco Product Technology

Cominco Product Technology's mission is to advance the technology of Cominco's metals.

Sheridan Park
2380 Speakman Drive
Mississauga, Ontario
L5K 1B4

Telephone No.:
(905) 822-2022
Facsimile No.:
(905) 822-2882

Key Officers:
Dr. E.M. Valeriote (Manager, Product Technology Centre)
Contact:
Dr. E.M. Valeriote (ext.230)

Parent Co.:
Cominco Ltd.

Human Resources in the ATF Program:
Total Employees: 17
(plus subcontractors)
Management: 2
Engineering/Technical: 5
Administrative: 2
Laboratory/Shop: 8

Alternative Transportation Fuels (ATF) Research, Development & Testing Capabilities:

Fuel Type:	Areas of Expertise:	Specialized Equipment:
Electricity	lead-acid batteries	Manufacturing equipment Battery test facilities Continuous casting and metal expanding

Sales of ATF Products and Services:
Annual Sales: $8 million
Percent Exported: 100%
Major Customers: battery manufacturers

Main Export Markets:
USA, Korea, Spain

Other Services Offered to Customer:
Customer technical assistance, product research and development

Capabilities / Achievements
Canada Awards for Excellence (silver)

Research, Development and Testing

The Electrofuel Manufacturing Co. Ltd.

21 Hanna Avenue
Toronto, Ontario
M6K 1W8

Telephone No.:
(416) 535-1114
Facsimile No.:
(416) 535-2361

Key Officers:
Dr. James K. Jacobs
Dr. Sankar Das Gupta

Alternative Transportation Fuels (ATF) Research, Development & Testing Capabilities:		
Fuel Type:	**Areas of Expertise:**	**Specialized Equipment:**
Methanol	Engine component	Ceramic glow plugs for heat engines
Electricity	High energy density batteries	Advanced batteries

Capabilities / Achievements

Patented lithium rechargeable batteries for electric vehicles

Patented ceramic glow plugs for use in heat-engines

Research, Development and Testing

The Electrolyser Corporation Ltd.

The Electrolyser Corp. Ltd. will be a world market leader in the supply of water electrolysis equipment and through providing hydrogen vehicle refuelling systems develop new markets for electrolytic hydrogen in the transportation sector.

122 The West Mall
Etobicoke, Ontario
M9C 1B9

Telephone No.:
(416) 621-9410
Facsimile No.:
(416) 621-9830

Key Officers:
A.K. Stuart (CEO)
A.T.B. Stuart
(V.P. Technology)
Contact:
M.J. Fairlie
(Director of Technology)

Subsidiary/Affiliated Co.:
IEQ
Electrolyser Corp.

Human Resources in the ATF Program:
Total Employees: 6-10
Management: 1
Engineering/Technical: 4-6
Administrative: 1
Laboratory/Shop: 2

Alternative Transportation Fuels (ATF) Research, Development & Testing Capabilities:

Fuel Type:	Areas of Expertise:	Specialized Equipment:
Hydrogen	Hydrogen production and gas-handling systems	Hydrogen generators and gaseous fuels vehicle refueling equipment
Hythane (natural gas and hydrogen)	Hydrogen supply logistics	

Sales of ATF Products and Services

Main Export Markets: global

Major Customers:

Hydro-Quebec
STCUH (Montreal Urban Transit)
South Coast Air Quality Management District
University of California at Riverside
Mazda

Other Services Offered to Customer

Hydrogen source/market analysis
Hydrogen energy system technical and economic assessments

Capabilities / Achievements

Financial Post Appropriate Technology Award (1992)

Worlds first photovoltaic vehicle refueling station (1993)

Etobicoke Business Excellence Award

Research, Development and Testing

Environment Canada

Environment Canada supports federal government programs on mobile source exhaust emissions (ie. inventories, regulation and guideline development, compliance, etc.); we support industry's technology development to address mobile source emissions.

Mobile Sources Emissions Division
Environmental Technology Centre
3439 River Road
Gloucester, Ontario
K1A 0H3

Telephone No.:
(613) 998-9590
Facsimile No.:
(613) 952-1006

Key Officers:
Fred Hendren
(Manager)
Greg Rideout
(Emissions Research)
Jacek Rostkowski
(Technology Development)

Contact:
Peter Barton

Human Resources in the ATF Program:
Total Employees: 25
Management: 2
Engineering/Technical: 13
Administrative: 1
Laboratory/Shop: 9

Alternative Transportation Fuels (ATF) Research, Development & Testing Capabilities:

Fuel Type:	Areas of Expertise:	Specialized Equipment:
Ethanol/Methanol/Blends CNG/LPG/Dual Fuels Reformulated Fuels	Exhaust emissions and performance testing	Chassis and engine dynamometers Cold chamber with chassis dynamometers. Sampling systems Complete chemical analysis instrumentation for compound characterization

Other Services Offered to Customer:
Collaboration on joint projects with industry;
"in kind" resources for technology development

Research, Development and Testing

Inco Limited

Inco's J. Roy Gordon Research Laboratory supports Inco's supply of nickel foam; nickel hydroxide with nickel metal powder for positive plate of batteries; and, nickel electrodes.

J. Roy Gordon
Research Laboratory
Sheridan Park
Research Centre
2060 Flavelle Boulevard
Mississauga, Ontario
L5K 1Z9

Telephone No.:
(905) 403-2443
Facsimile No.:
(905) 403-2530

Key Officers:
J.A.E. Bell
V.A. Ettel
Contact:
V.A. Ettel

Human Resources:
Total Employees: 17

Alternative Transportation Fuels (ATF) Research, Development & Testing Capabilities:	
Fuel Type:	**Areas of Expertise:**
Electricity	Batteries

Sales of ATF Products and Services:
Major Customers:
Nickel metal hydroxide battery manufacturers (Ni-Fe, NiCd)

Research, Development and Testing

International Approvals Services

CGA Approvals Inc. (a joint partner of IAS) is committed to providing quality services of uncompromising technical excellence, reliability and cost-effectiveness which meet and exceed its customers' expectations.

55 Scarsdale Road
Toronto, Ontario
M3B 2R3

Telephone No.:
(416) 447-6468
Facsimile No.:
(416) 447-1026

Key Officers:
Doug Hannesen
(Test Coordinator)
Henry Wong
(Product Group Coordinator)
George Mallinos
(Certification Engineer)
Contact:
Doug Hannesen

Parent Co.:
A joint venture of CGA Approvals Inc. and AGA Laboratories
Subsidiary/Affiliated Co.:
AGA Laboratories, USA

Human Resources in the ATF Program:
Total Employees: 10
Management: 1
Engineering/Technical: 2
Administrative: 3
Laboratory/Shop: 3

Alternative Transportation Fuels (ATF) Research, Development & Testing Capabilities:

Fuel Type:	Areas of Expertise:	Specialized Equipment:
Natural Gas LPG/Propane	Product testing and certification	High pressure test facilities Special test facilities

Other Services Offered to Customer:

Publishing of national standards for natural gas and LPG vehicle components and related equipment

Special test programs for new products and prototypes

Engineering reports

Research, Development and Testing

Motion Concept Vehicles Inc.

MCV strives for excellence in the manufacture of Alternative Fuel Vehicles and consulting engineering to the ATF industry.

1980 Boylen Road, Unit 5&6
Mississauga, Ontario
L5S 1P5

Telephone No.:
(905) 672-0332
Facsimile No.:
(905) 672-0113

Key Officer:
Robert J. Waddell
(President)
Contact:
Robert J. Waddell

Human Resources:
Total Employees: 4

Alternative Transportation Fuels (ATF) Research, Development & Testing Capabilities:		
Fuel Type:	**Areas of Expertise:**	**Specialized Equipment:**
Natural Gas Hydrogen	Vehicle/Engine development	Engine dynamometer

Main Export Markets:
USA

Other Services Offered to Customer:
Product development and design - Finite Element Analysis

Capabilities / Achievements
Design and development of NG-powered Canadian "Super Car"

Research, Development and Testing

ORTECH Corporation

2395 Speakman Drive
Mississauga, Ontario
L5K 1B3

Telephone No.:
(905) 822-4111
Facsimile No.:
(905) 823-1446

Key Contacts:
Lou Bruno (General Manager, Engineering & Transportation Technologies)
Stephen Carter (Director, Engine Technologies)
Wendel Goetz, (Manager, Engines)

Human Resources:
Total Employees: 300+
Alternative Transportation Fuels: 32
Management: 2
Administrative: 2
Laboratory/Shop: 4

Capabilities / Achievements
Key role in development of five current production NGV engines.

Current production of three gaseous fueling systems developed at ORTECH (patented).

Main Export Markets:
USA, Europe, Asia

ORTECH provides comprehensive services in the field of alternative fuels for both light duty and heavy duty engine platforms. Services include design, development, performance validation and emission characterization. ORTECH is committed to providing the highest possible quality of technical services which satisfy and preferably exceed client expectations. We are client focused and seek continuous improvement in quality and productivity.

Alternative Transportation Fuels (ATF) Research, Development & Testing Capabilities:

Fuel Type:	Areas of Expertise:	Specialized Equipment:
Natural Gas Propane Methanol Ethanol Biodiesel Hythane Hydrogen	Base engine development. Adaptation to alternative fuels. Low emission development, calibration and certification. Control system development. Durability and deterioration factor.	Computerized engine and chassis dynamometers test facilities. NG in test cells; NG compressor; Lambda meters. CAE, 2-D and 3-D CAD, CAM; Gaseous flow stand (SS and pulsing); ASIC and imbedded microprocessor controller design development. PCB layout software. Computerized mapping, injection. CARB accepted engine and chassis emissions test facilities.

Annual Sales of ATF Products and Services:
Annual sales: over $3 million
Percent exported: 50%
Major customers: H.D. engine manufacturers, integrated oil multi-nationals, automotive OEMs

Other Services Offered to Customer:
Training, technology transfer, consulting, new product start-up assistance
Registered under ISO 9002

Research, Development and Testing

University of Toronto

The Department of Mechanical Engineering at U of T provides research support to facilitate the introduction of alternative fuels, with special emphasis on the potential of alternative fuels for reducing exhaust emissions.

Engine Research & Development Laboratory
Department of Mechanical Engineering
University of Toronto
5 King's College Road
Toronto, Ontario
M5S 1A4

Telephone No.:
(416) 978-5736
Facsimile No.:
(416) 978-7753

Contact:
Prof. J.S. Wallace

Human Resources:
Total Employees: 7
Engineering/Technical: 7

Alternative Transportation Fuels (ATF) Research, Development & Testing Capabilities:

Fuel Type:	Areas of Expertise:	Specialized Equipment:
Natural Gas Propane (LPG) Methanol Hydrogen	Alternative fuel use in spark ignition and diesel engines.	Engine dynamometer testing, including exhaust gas analysis.

Sales of ATF Products and Services:
Major Customers: British Gas, Nissan Canada, Natural Science and Engineering Research Council (NSERC), Natural Resources Canada

Capabilities / AchievementsCapabilities / Achievements

US patent awarded for gaseous fuel injection valve.